

### REMARKS

Claims 1-23 were pending in the Application. Applicants added claims 24-26. Hence, claims 1-26 are pending in the Application.

No new matter has been added. Newly added claim 24 is derived from former claim 11. Newly added claims 25 and 26 are based upon paragraph [0024] of the Specification.

Claim 11 is objected to. Claims 1-23 are rejected under 35 U.S.C. §112, first paragraph. Furthermore, claims 1-23 are rejected under 35 U.S.C. §112, second paragraph. Additionally, claims 1-3, 13-14 and 23 are rejected under 35 U.S.C. §101. In addition, claims 1-2, 7, 13-19 and 23 are provisionally rejected on the ground of non-statutory obviousness-type double patenting. Claims 1-3, 7-19 and 23 are rejected on the ground of non-statutory obviousness-type double patenting. Additionally, claims 1-23 are rejected under 35 U.S.C. §102(b). Furthermore, claims 1-23 are rejected under 35 U.S.C. §103(a).

Applicants address these objections and rejections below.

#### I. OBJECTION TO THE CLAIMS:

The Examiner has objected to claim 11 under 37 C.F.R. §1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Office Action (3/30/2010), page 3. As indicated above, Applicants amended claim 11 to be solely dependent upon claim 9. Hence, claim 11 is not in improper dependent form. Accordingly, Applicants kindly request the Examiner to withdraw the objection to claim 11.

#### II. REJECTIONS UNDER 35 U.S.C. §112, FIRST PARAGRAPH:

The Examiner has rejected claims 1-23 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Office Action (3/30/2010), page 3. In particular, the Examiner asserts that the claims previously amended to include the term “stable” encompass new matter as the claimed scope allegedly appears to be considerably broader than the teachings of the original disclosure. *Id.* at pages 3-5. As indicated above, Applicants removed the term

“stable” from the claims. Accordingly, Applicants kindly request the Examiner to withdraw the rejections of claims 1-23 under 35 U.S.C. §112, first paragraph.

III. REJECTIONS UNDER 35 U.S.C. 112, SECOND PARAGRAPH:

The Examiner has rejected claims 1-23 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Office Action (3/30/2010), page 5. As indicated above, Applicants have amended the claims to address the informalities pointed out by the Examiner on pages 5-8 of the present Office Action. Accordingly, Applicants kindly request the Examiner to withdraw the rejections of claims 1-23 under 35 U.S.C. §112, second paragraph.

IV. REJECTIONS UNDER 35 U.S.C. §101:

The Examiner has rejected claims 1-3, 13-14 and 23 under 35 U.S.C. §101 because the claimed inventions are allegedly directed to non-statutory subject matter. Office Action (3/30/2010), page 8. As indicated above, Applicants have amended independent claims 1, 2 and 13 to address the concerns as discussed on pages 8-9 of the present Office Action. In particular, Applicants are claiming a secondary treatment of a preformed substrate (defined in paragraph [0020] as an article capable of supporting a coating) so as to modify the surface properties of that substrate. Thus, step (i) cannot encompass any cross-linking that occurred during the production of the substrate itself. As a result, claims 1-3, 13-14 and 23 do not read onto any exposure of a cross-linked polymer to a plasma as asserted by the Examiner. Accordingly, Applicants kindly request the Examiner to withdraw the rejections of claims 1-3, 13-14 and 23 under 35 U.S.C. §101.

V. REJECTIONS UNDER OBVIOUSNESS-TYPE DOUBLE PATENTING:

The Examiner has provisionally rejected claims 1-2, 7, 13-19 and 23 under the judicially created doctrine of obviousness-type double patenting in view of claims 1-21 of co-pending U.S. Patent Application No. 10/509,295. Office Action (3/30/2010), page 11.

Co-pending U.S. Patent Application No. 10/509,295 describes a process in which a coating is deposited, fluorinated and then cured. Both the first and the third of these steps may involve cross-linking. However, any cross-linking occurring in the deposition step is concurrent with the deposition and therefore is not applied to a cross-linkable material present on the surface of the substrate as required by amended claim 1. Hence, it is not seen that this could be considered to be equivalent to step (i) of the present application. Furthermore, if the curing step is regarded as being equivalent to step (i) of the present application because cross-linking occurs, then there is no equivalent to step (ii) in the present claim 1.

As a result, it is not seen that the present sequence is obvious from any disclosure in co-pending U.S. Patent Application No. 10/509,295. There is no suggestion in that reference to suggest that increasing the level of internal cross-linking in a substrate before plasma modification or deposition would be in any way desirable. Thus, the invention of the present application is not obvious in the light of this application.

The Examiner has further claim 23 under the judicially created doctrine of obviousness-type double patenting in view of claims 1, 12-13 and 20-26 of Badyal et al. (U.S. Patent No. 6,551,950) (hereinafter "Badyal II"). Office Action (3/30/2010), page 13.

As understand by Applicants, the Examiner is alleging that previous claim 23 reads onto any substrate of cross-linked material that had a plasma coating deposited on it. As indicated above, claim 23 was amended to refer to new claim 26, which requires effectively that the underlying substrate have a variable degree of cross-linking, with an increased amount of internal cross-linking at the surface. This distinct physical feature is not taught in Badyal II, which simply teaches the deposition of polymer coatings onto substrates using a plasma polymerisation process. There is no suggestion that the substrate should be pre-treated in order to increase the level of internal cross-linking within the material at the surface of the substrate. As a result, it is believed that amended claim 23 is not obvious in the light of this reference.

Additionally, the Examiner has rejected 1-3 and 7-19 under the judicially created doctrine of obviousness-type double patenting in view of claims 1-9 and 24 of Badyal II in view of Seki et al. (JP 03-14677) (hereinafter "Seki") Office Action (3/30/2010), page 14.

As indicated above, claim 1 was amended to require that in a first discrete step, material of the substrate has cross-linking at the surface introduced or enhanced. Thereafter, it may be subject to plasma modification or deposition in a second discrete step. Badyal II discloses a deposition process in which a polymer is formed from a monomer at the surface using a plasma deposition process. The Examiner has referred back to her comments in Section 8 of the present Office Action where she reads the suggestion at column 1, lines 22-35 of Badyal II that cross-linking for coatings on fabrics is desirable. This conclusion appears somewhat tenuous. What Badyal II in fact discloses is that previously, cross-linking resins have been used to assist in adhering coatings to fabrics, but that this caused problems because the resins themselves damaged the fabrics. The solution of this problem is to utilise a plasma deposition process to effectively grow the polymeric coating directly on the surface by the plasma treatment of a monomer and thus avoid the need for a cross-linking resin. Seki also teaches a process in which a polymer is deposited onto a surface using a plasma, and thereafter, the polymer formed is cross-linked using an inert plasma treatment.

There is no suggestion in either reference that the level of the internal cross-linking within the material of the substrate itself, prior to plasma modification, would in any way be beneficial. Therefore, the invention of the present application is not obvious from this combination of references.

Consequently, in view of the foregoing, the Examiner has not provided a basis for an obviousness-type double patenting rejection of claims 1-3, 7-19 and 23. Thus, the rejections of claims 1-3, 7-19 and 23 under obviousness-type double patenting are improper.

VI. REJECTIONS UNDER 35 U.S.C. §102(b):

The Examiner has rejected claims 1-3, 8, 13-19 and 23 under 35 U.S.C. §102(b) as being anticipated by Yamasaki et al. (U.S. Patent No. 6,156,394) (hereinafter “Yamasaki”). Additionally, the Examiner has rejected claims 1-2 and 7-10<sup>1</sup> under 35 U.S.C. §102(b) as being anticipated by Nguyen et al. (U.S. Patent No. 5,244,730) (hereinafter “Nguyen”). Applicants respectfully traverse these rejections for at least the reasons stated below and respectfully request the Examiner to reconsider and withdraw these rejections.

A. Claims 1-3, 8, 13-19 and 23 are not anticipated by Yamasaki.

Applicants respectfully assert that Yamasaki does not disclose a specific cross-linking step to be of any assistance in the process as recited in independent claims 1, 2 and 13. Yamasaki instead discloses that a high energy treatment of a surface “changes the surface chemistry of the substrate to provide sites for chemical bonding with a variety of different optical coatings” (see column 6, lines 15-16). It is reported also that the stoichiometry of the surface of the substrate changes as a result of the pretreatment step. However, it is only speculation that the cross-linking of the surface has increased as a result. Specifically, column 6, lines 21-26 recites that:

The changes in stoichiometry and increased resistance to acetone damage suggest that the pretreatment method of the present invention forms cross-linked bonds with the surface interface layer as a consequence of the plasma treatment. (emphasis added)

Thus, there is no clear teaching that a treatment of a surface by exposure to the types of electromagnetic radiation described in this reference actually results in cross-linking, only that it is a possibility that it may happen incidentally.

Yamasaki further teaches that exposure to high energy radiation enhances the adhesive properties of the substrate, so that this will then be more receptive to subsequent coating procedures which are said to be a “variety of different methods, including chemical vapour deposition, plasma chemical deposition, evaporation,

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<sup>1</sup> Applicants note that claims 7-10 depend from claim 3; however, the Examiner has not indicated that claim 3 is rejected under 35 U.S.C. §102(b) as being anticipated by Nguyen. Applicants believe that either claims 7-10 should not be rejected under 35 U.S.C. §102(b) as being anticipated by Nguyen or that the Examiner intended to reject claim 3 under 35 U.S.C. §102(b) as being anticipated by Nguyen. Applicants request clarification under 37 C.F.R. §1.104(c)(2).

sputtering, or wet chemical techniques” (see column 8, lines 18-21). Therefore, there is no language in Yamasaki that discloses or suggests specific techniques to introduce or enhance cross-linking would be particularly advantageous in combination with plasma modification techniques generally.

In effect therefore, the method of the present claims could be regarded as a novel selection from within the generic disclosure of Yamasaki. Furthermore, the selection of this particular combination of steps is not obvious from Yamasaki, since it is silent on any benefits associated with possible cross-linking in relation to plasma deposition techniques. Indeed, the examples show a pretreatment using a plasma followed by a microwave deposition technique, and so cannot demonstrate any advantage for the particular combination of the present claims.

Thus, Yamasaki does not disclose all of the claim limitations of claims 1, 2 and 13, and thus Yamasaki does not anticipate claims 1, 2 and 13. M.P.E.P. §2131.

Claims 3, 8 and 23 each recite a combination of features of independent claim 1, and hence claims 3, 8 and 23 are not anticipated by Yamasaki for at least the above-stated reasons that claim 1 is not anticipated by Yamasaki.

Furthermore, claims 14-19 each recite a combination of features of independent claim 13, and hence claims 14-19 are not anticipated by Yamasaki for at least the above-stated reasons that claim 13 is not anticipated by Yamasaki.

B. Claims 1-2 and 7-10 are not anticipated by Nguyen.

Nguyen discloses a relatively conventional plasma deposition process, in which a polymer film is deposited and concurrently cross-linked on a substrate. There is no language in Nguyen that discloses or suggests a pretreatment to introduce or enhance the cross-linking of the substrate prior to the deposition would be of any benefit. Thus, it clearly does not disclose the two step sequence as recited in independent claims 1 and 2.

The Examiner has noted that the walls of the Nguyen chamber are coated with a fluorocarbon and has suggested that these will be cross-linked during a subsequent deposition. Office Action (3/30/2010), page 26. However, it is not clear to

Applicants, in view of the requirement expressed at column 3, lines 22-26, that the coating of the walls should not be allowed to get too thick, that this actually occurs. However, assuming *arguendo* that it does, the plasma contains a monomer gas, which means that any cross-linking will be with a new layer being deposited rather than internally within the material of the pre-existing coating.

Therefore, even if the walls are subject to coating during successive deposition processes, they will not be subject to the type of cross-linking process required by step (i) of independent claims 1 and 2.

Thus, Nguyen does not disclose all of the limitations of claims 1 and 2, and thus Nguyen does not anticipate claims 1 and 2. M.P.E.P. §2131.

Claims 7-10 each recite a combination of features of independent claim 1, and hence claims 7-10 are not anticipated by Nguyen for at least the above-stated reasons that claim 1 is not anticipated by Nguyen.

VII. REJECTIONS UNDER 35 U.S.C. §102(b)/§103(a):

The Examiner has rejected claims 1-3, 7-16 and 22-23 under 35 U.S.C. §102(b) as being anticipated by Badyal et al. (U.S. Patent No. 6,358,569) (hereinafter “Badyal I”), or in the alternative, under 35 U.S.C. §103(a) as being obvious over Badyal I. Additionally, the Examiner has rejected claims 1-3, 8-10 and 13 under 35 U.S.C. §102(b) as being anticipated by Kamel et al. (U.S. Patent No. 5,326,584) (hereinafter “Kamel”), or in the alternative, under 35 U.S.C. §103(a) as being obvious over Kamel in view of Yamasaki. Furthermore, the Examiner has rejected claims 1-8, 13-14 and 17-23 under 35 U.S.C. §102(b) as being anticipated by Peyman et al. (U.S. Patent No. 4,312,575) (hereinafter “Peyman”), or in the alternative, under 35 U.S.C. §103(a) as being obvious over Peyman. In addition, the Examiner has rejected claims 1, 3, 8, and 13-23 under 35 U.S.C. §102(b) as being anticipated by Sano et al. (U.S. Patent No. 4,265,959) (hereinafter “Sano”), or in the alternative, under 35 U.S.C. §103(a) as being obvious over Sano.

Applicants respectfully traverse these rejections for at least the reasons stated below and respectfully request the Examiner to reconsider and withdraw these rejections.

- A. Claims 1-3, 7-16 and 22-23 are not anticipated by Badyal I and are patentable over Badyal I.

As understood by Applicants, the Examiner relies upon Badyal I because the Examiner believes that it would be implicit that cross-linking occurred between the substrate and the plasma deposit layer which the Examiner believes is equivalent to step (i) of independent claims 1, 2 and 13. However, as is clear from amended claims 1, 2 and 13, cross-linking between the substrate and the layer is not what is done in step (i) of the present invention; rather the internal cross linking within cross-linkable material of the substrate is introduced or enhanced before any plasma deposition process is carried out. Such a preliminary step is not shown in Badyal I, and neither is there anything in the teaching of Badyal I that would motivate a skilled person to consider such a preliminary step.

Badyal I does not rectify this deficiency because there is no teaching or suggesting for such a step. However, Applicants have found that introducing or enhancing the level of cross-linking present in the material at the surface of the substrate itself makes it more stable and ready to receive a plasma modification treatment. This is not obvious from any of the references, including Badyal I, which are silent on the level of cross-linking that should be present in the material of the substrate.

Thus, Badyal I does not anticipate claims 1, 2 and 13, and thus Badyal I does not anticipate claims 1, 2 and 13. M.P.E.P. §2131.

Furthermore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1, 2 and 13, since the Examiner is relying upon incorrect, factual predicates in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Claims 3, 7-12 and 22-23 each recite a combination of features of independent claim 1, and hence claims 3, 7-12 and 22-23 are not anticipated by Badyal I and are



patentable over Badyal I for at least the above-stated reasons that claim 1 is not anticipated by Badyal I and is patentable over Badyal I.

Additionally, claims 14-16 each recite a combination of features of independent claim 13, and hence claims 14-16 are not anticipated by Badyal I and are patentable over Badyal I for at least the above-stated reasons that claim 13 is not anticipated by Badyal I and is patentable over Badyal I.

B. Claims 1-3, 8-10 and 13 are not anticipated by Kamel and are patentable over Kamel in view of Yamasaki.

Kamel teaches a plasma process in which, as an initial step, the surface layer of the substrate is removed or etched away (see abstract) before a subsequent layer is grafted onto it using a plasma deposition process. The Examiner has suggested that such a process would have inherently produced cross-linking in the surfaces although the Examiner has not substantiated this claim. It is certainly not clear that a process that effectively destroys a polymeric material and thus breaks down chemical bonds in the surface layer would at the same time create new bonds elsewhere as a result of cross-linking.

As a result, it is not seen that the conditions described by Kamel can be said to be those that would produce cross-linking in the particular substrate being used and so it is not seen that this reads onto step (i) of independent claims 1, 2 and 13. Furthermore, as discussed above, even if one were to read Kamel in the light of Yamasaki as proposed by the Examiner, Yamasaki does not explicitly teach that cross-linking occurs; it only speculates on this as a possibility. This would not be sufficient to convince a reader that what is happening in Kamel is a cross-linking process, bearing in mind the very clear teaching that the surface must effectively be destroyed in the process.

Thus, Kamel does not anticipate claims 1, 2 and 13, and thus Kamel does not anticipate claims 1, 2 and 13. M.P.E.P. §2131.

Furthermore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1, 2 and 13, since the Examiner is relying upon

incorrect, factual predicates in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Claims 3 and 8-10 each recite a combination of features of independent claim 1, and hence claims 3 and 8-10 are not anticipated by Kamel and are patentable over Kamel in view of Yamasaki for at least the above-stated reasons that claim 1 is not anticipated by Kamel and is patentable over Kamel in view of Yamasaki.

C. Claims 1-8, 13-14 and 17-23 are not anticipated by Peyman and are patentable over Peyman.

Applicants respectfully assert that Peyman is not believed to be relevant to the amended independent claims (claims 1, 2 and 13) because it does not disclose a preliminary step in which internal cross-linking of the material of the substrate itself is introduced or enhanced before a plasma modification/deposition step. The Examiner has noted that the layer coated onto the substrate is highly cross-linked and suggests that it is implicit that there will be some cross-linking between this coating and the substrate. Office Action (3/30/2010), pages 28-29. That may or may not be correct, but it is clear that there is no specific internal cross-linking of the material of the substrate before the coating is added and so there is nothing equivalent to step (i) of independent claims 1, 2 and 13. Furthermore, there is nothing to motivate a skilled person towards carrying out such a step because there is no suggestion that cross-linking or enhanced cross-linking of the substrate would in any way provide any benefits in respect of a later plasma process. As a result, it cannot be obvious.

Thus, Peyman does not anticipate claims 1, 2 and 13, and thus Peyman does not anticipate claims 1, 2 and 13. M.P.E.P. §2131.

Furthermore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1, 2 and 13, since the Examiner is relying upon incorrect, factual predicates in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Claims 3-8 and 22-23 each recite a combination of features of independent claim 1, and hence claims 3-8 and 22-23 are not anticipated by Peyman and are

patentable over Peyman for at least the above-stated reasons that claim 1 is not anticipated by Peyman and is patentable over Peyman.

Furthermore, claims 14 and 17-21 each recite a combination of features of independent claim 13, and hence claims 14 and 17-21 are not anticipated by Peyman and are patentable over Peyman for at least the above-stated reasons that claim 13 is not anticipated by Peyman and is patentable over Peyman.

D. Claims 1, 3, 8 and 13-23 are not anticipated by Sano and are patentable over Sano.

Applicants respectfully assert that Sano does not teach the process as recited in independent claims 1 and 13 because, again, it does not teach a preliminary cross-linking step of the material of the substrate. Sano teaches a process whereby a membrane is cast by applying a layer of a solution onto a support, such as a glass plate, and allowing it to “set” by solvent evaporation and gelation. The Examiner has equated the gelation step with a “cross-linking” step such as that required in step (i) of independent claims 1 and 13. The mechanism by which the solid membrane forms is not clear in Sano and so it is not seen that this is necessarily a cross-linking process. However, it is clear that the liquid casting of Sano cannot fulfil the definition of “substrate” required by paragraph [0020] of the present invention, since the liquid phase clearly cannot support a coating. It is only when the casting is complete that the solid membrane is formed. Thus, this step cannot equate to step (i) of independent claims 1 and 13.

Once formed, the Sano membrane may be plasma treated and subsequently subject to sulfonation which may result in cross-linking. There is no suggestion that the sequence should be carried out in reverse and that the sulphonation step carried out before the plasma-treatment. Furthermore, since there is no suggestion that the introduction or enhancement of cross-linking of the substrate will facilitate the plasma treatment in anyway, there is nothing to motivate the reader to arrive at a process falling within the scope of the present claims.

Thus, Sano does not anticipate claims 1 and 13, and thus Sano does not anticipate claims 1 and 13. M.P.E.P. §2131.

Furthermore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1 and 13, since the Examiner is relying upon incorrect, factual predicates in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Claims 3, 8 and 22-23 each recite a combination of features of independent claim 1, and hence claims 3, 8 and 22-23 are not anticipated by Sano and are patentable over Sano for at least the above-stated reasons that claim 1 is not anticipated by Sano and is patentable over Sano.

Furthermore, claims 14-21 each recite a combination of features of independent claim 13, and hence claims 14-21 are not anticipated by Sano and are patentable over Sano for at least the above-stated reasons that claim 13 is not anticipated by Sano and is patentable over Sano.

VIII. REJECTIONS UNDER 35 U.S.C. §103(a):

The Examiner has rejected claims 1-3, 7-19 and 23 under 35 U.S.C. §103(a) as being unpatentable over Badyal II in view of Seki. Applicants respectfully traverse these rejections for at least the reasons stated below and respectfully request the Examiner to reconsider and withdraw these rejections.

Independent claims 1, 2 and 13 require that in a first discrete step, material of the substrate has cross-linking at the surface introduced or enhanced. Thereafter, it may be subject to plasma modification or deposition in a second discrete step. Badyal II, on the other hand, teaches a deposition process in which a polymer is formed from a monomer at the surface using a plasma deposition process.

As understood by Applicants, the Examiner refers to her comments in Section 8 of the present Office Action where she reads the suggestion at column 1, lines 22-35 of Badyal II as concluding that cross-linking for coatings on fabrics is desirable. Such a conclusion is somewhat tenuous. Badyal II in fact teaches that previously, cross-linking resins have been used to assist in adhering coatings to fabrics, but that this caused problems because the resins themselves damaged the fabrics. The solution of this problem is to utilise a plasma deposition process to effectively grow

the polymeric coating directly on the surface by the plasma treatment of a monomer and thus avoid the need for a cross-linking resin.

Furthermore, Seki also teaches a process in which a polymer is deposited onto a surface using a plasma, and thereafter, the polymer formed is cross-linked using an inert plasma treatment.

Hence, there is no teaching or suggestion in either reference that the level of the internal cross-linking within the material of the substrate itself, prior to plasma modification, would in any way be beneficial.

Therefore, the Examiner has not presented a *prima facie* case of obviousness in rejecting claims 1, 2 and 13, since the Examiner is relying upon incorrect, factual predicates in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Claims 3, 7-12 and 23 each recite a combination of features of independent claim 1, and hence claims 3, 7-12 and 23 are patentable over Badyal II in view of Seki for at least the above-stated reasons that claim 1 is patentable over Badyal II in view of Seki.

Additionally, claims 14-19 each recite a combination of features of independent claim 13, and hence claims 14-19 are patentable over Badyal II in view of Seki for at least the above-stated reasons that claim 13 is patentable over Badyal II in view of Seki.

IX. CONCLUSION:

As a result of the foregoing, it is asserted by Applicants that claims 1-26 in the Application are in condition for allowance, and Applicants respectfully request an allowance of such claims. Applicants respectfully request that the Examiner call Applicants' attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining issues.

Respectfully submitted,

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